

REMARKS

Claims 1-35 were pending all of which were rejected. New claim 43 has been added. Reconsideration is respectfully requested.

Claim Rejections – 35 U.S.C. §102

Claims 1, 3-4, 7, 15-21, 29, and 31-34 were rejected under 35 U.S.C. §102(e) as being anticipated by Song (2004/0036980) ("Song"). Applicant requests reconsideration.

Independent Claim 1 recites, among other things, "a light emitting diode comprising a chip having a light emitting surface that emits light having a range of wavelengths into a medium with a refractive index of less than 1.25" and "a collimating optical element disposed to receive the light having only the range of wavelengths emitted from the light emitting surface of the chip".

In the Response to Arguments, the Examiner takes the position that although Song discloses a single wavelength laser diode, e.g., "a red laser diode (wavelength 650 nm)" or "a blue laser diode (wavelength 405)" (paragraph [0058]), an inherent function of an LED is to produce a range of wavelengths. Therefore, according to the Examiner, Song meets the claim limitations of claim 1.

Applicant respectfully disagrees and requests reconsideration. Claims are to be given their broadest reasonable interpretation "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364[, 70 USPQ2d 1827] (Fed. Cir. 2004). See, MPEP §2111. "The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999)". Ibid.

Applicant submits that it is an unreasonable and inconsistent with the specification to interpret the claimed "a range of wavelengths" as a single wavelength, e.g., "a red laser diode (wavelength 650 nm)" because the red laser diode "would emit a range from orange (620 nm) to near IR (750 nm), where the peak (strongest intensity) is around 650 nm" For example, the present application at paragraph [0037] states "By way of example, layer 168 may be a wavelength converting material, such as a fluorescent material, e.g., phosphor, that converts the wavelength of the light produced by chip 152." Thus, the specification describes the light produced by the chip 152 (without the wavelength converting material) as a single

SILICON VALLEY
PATENT GROUP LLP
18805 Cox Avenue
Suite 220
San Diego, CA 92128
(408) 378-7777
FAX (408) 378-7770

wavelength, not a range of wavelengths with a peak at a particular wavelength. Accordingly, the specification recognizes the difference between a single wavelength and a range of wavelengths. Applicant submits that the Examiner's interpretation of "a range of wavelengths" as a single wavelength is thus inconsistent with any reasonable interpretation of the specification.

Moreover, Applicant submits that the Examiner's interpretation is inconsistent with an interpretation that would be reached by those skilled in the art. According to the Examiner's interpretation, it is impossible to distinguish between a single wavelength and multiple wavelengths. Single wavelengths versus multiple wavelengths, however, is well recognized in the art, as indicated by Song itself referring to "a 650 nm-wavelength light source" and "a 405 nm-wavelength light source". Paragraph [0037].

Additionally, claim 1 recites "a light emitting diode comprising a chip having a light emitting surface that emits light having a range of wavelengths into a medium with a refractive index of less than 1.25." The Examiner states in the Response to Arguments that "Song discloses the LED 110 emits light into air gap between the LED and lens 120 (Fig. 1) and Song discloses the refractive index of air is 1.0 (paragraph [0082]).

As is discussed in detail in the specification of the present application, the emission of light into a medium with a low refractive index, such as the ambient environment, is important because it reduces the étendue and, thus, increases the luminance of the LED. See, e.g., paragraphs 31, 34-35.

Song does not disclose a chip with a light emitting surface that emits light into the air gap. While not discussed in the text, Song, shows that the light source 110 is covered by a lens. Thus, the lens emits light into the air gap, not the light emitting surface of a chip. The following figures illustrate Fig. 1 and a close up view of the laser diode 110 from Fig. 1 in Song.

SILICON VALLEY
PATENT GROUP LLP
18605 Cien Avenue
Suite 220
Saratoga, CA 95070
(408) 378-7777
FAX (408) 378-7770

FIG.1

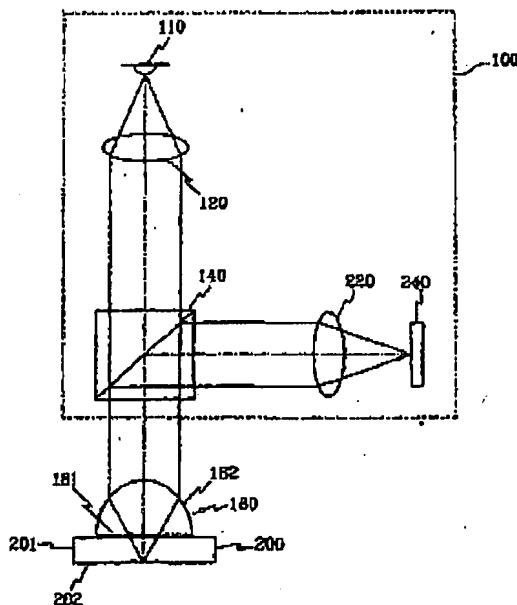
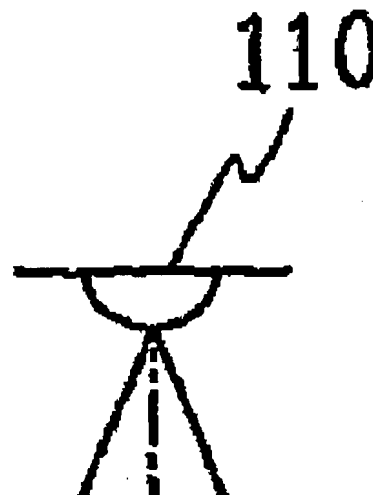


Figure 1



Enlarged View of Laser Diode 110

The figures clearly show that a lens is present over the laser diode chip, as chips are not hemispherical. Thus, Song does not disclose "a light emitting diode comprising a chip having a light emitting surface that emits light having a range of wavelengths into a medium with a refractive index of less than 1.25."

Accordingly, Song fails to teach or suggest all the limitations of Claim 1. Thus, Applicant respectfully submits that Claim 1 is patentable over Song. Reconsideration and withdrawal of this rejection is respectfully requested. Claims 3-4, and 7, and 15-16 depend from Claim 1 and are, therefore, likewise patentable for at least the same reasons.

Independent Claim 17 recites "a light emitting diode comprising a chip having a light emitting surface, wherein the light emitting surface is not covered by an encapsulant such that the light emitting surface emits light directly into the ambient environment".

In the Response to Arguments, the Examiner takes the position that Song does not any encapsulant, encapsulation, or encapsulating material on light-emitting chip 110.

While the exact term "encapsulant" is not used in Song, Song does state that the light source 110 is "provided as a diode module having a protective window. That is, light

SILICON VALLEY
PATENT GROUP LLP

1800 Cox Avenue
Suite 220
Sunnyvale, CA 95070
(408) 378-7777
FAX (408) 378-7770

diverging from a light emitting diode chip passes through the protective window". Paragraph [0065]. Thus, Song does not disclose that the "light emitting surface emits light directly into the ambient environment" as recited in Claim 17.

Moreover, as discussed above, the light source 110 is illustrated in Song as including a rounded lens element, which is an encapsulant.

Accordingly, Song fails to teach or suggest all the limitations of Claim 17. Thus, Applicant respectfully submits that Claim 17 is patentable over Song. Reconsideration and withdrawal of this rejection is respectfully requested. Claims 18-21 and 29 depend from Claim 17 and are, therefore, likewise patentable for at least the same reasons.

Independent Claim 31 recites "a light emitting diode comprising a chip having a light emitting surface that emits light having a range of wavelengths a light emitting diode comprising a chip having a light emitting surface that emits light having a range of wavelengths into a medium with a refractive index of less than 1.25." As discussed in reference to Claim 1, it is unreasonable and inconsistent with the specification to interpret the claimed "a range of wavelengths" as being taught in Song as a laser diode with a single wavelength.

Additionally, as discussed in reference to Fig. 1, Song discloses a lens over the laser diode chip, as chips are not hemispherical. Thus, Song does not disclose "a light emitting diode comprising a chip having a light emitting surface that emits light having a range of wavelengths into a medium with a refractive index of less than 1.25."

Claim 31 also recites "a micro-display disposed to receive the light emitted from the light emitting surface of the chip after the light passes through the collimating optical element". Song does not teach or suggest a micro-display, nor does the Examiner address this element.

The Examiner states that in the Response to Arguments that "Song discloses an optical disc 200 (micro-display) in the optical module 100 (paragraph [0028])." Applicant respectfully disagrees. Optical disc 200 is an optical recording media "such as "compact discs (CDs), digital versatile discs (DVDs), mini discs (MDs), and magneto optical discs".

Paragraph [0027]. The optical disc is not a display much less a "micro-display".

Accordingly, Song fails to teach or suggest all the limitations of Claim 31. Thus, Applicant respectfully submits that Claim 31 is patentable over Song. Reconsideration and

SILICON VALLEY
PATENT GROUP LLP
10805 COW AVENUE
SUITE 220
SAN DIEGO, CA 92120
(408) 378-7777
FAX (408) 378-7770

withdrawal of this rejection is respectfully requested. Claims 32-34 depend from Claim 31 and are, therefore, likewise patentable for at least the same reasons.

Claim Rejections – 35 U.S.C. §103

Claim 2 was rejected under 35 U.S.C. §103(a) as being unpatentable over Song. Applicant requests reconsideration.

Applicant notes that the Examiner has not acknowledged or responded to Applicant's arguments with respect to independent claim 2 in the present Office Action.

Claim 2 recites "a chip having a light emitting surface that emits light into a medium with a refractive index of less than or equal to approximately 1.25", which as discussed above in reference to claim 1 is not disclosed in Song.

Further, Claim 2 recites "wherein the collimating optical element and the chip are separated by a distance that is less than or equal to approximately 50% of the width of the chip." While the Examiner stated that the distance is considered to involve routine optimization, Applicant disagrees. Applicant points out that the Examiner's rejection appears to be premised on Okazaki as opposed to Song. For example, Applicant's attorney can not find reference to optical element 7 in Song. Moreover, there is no discussion or suggestion in Song to separate the collimating optical element and the chip by a distance that is less than or equal to approximately 50% of the width of the chip. For example, the figures of Song illustrate a large distance between the light source 110 and the collimating lens 120.

Applicant submits that contrary to the Examiner's statement, the recited structure is not merely an optimum or workable range. The claim recites a cooperative structure including the "chip having a light emitting surface that emits light into a medium with a refractive index of less than or equal to approximately 1.25" which permits the collimating optical element to be placed a close distance, e.g., less than or equal to approximately 50% of the width of the chip. Song does not disclose the same structure and could not be so modified due to the use of a lens and the protective window as discussed in paragraph [0065].

Claims 5, 22, and 35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Song in view of Waitl et al. (6,610,563) ("Waitl"). Reconsideration is requested.

Claim 5 depends from Claim 1, Claim 22 depends from Claim 17 and Claim 35 depend from Claim 31. Waitl does not make up for the deficiencies of Song. Accordingly,

SILICON VALLEY
PATENT GROUP LLP
18800 Cow Avenue
Suite 220
San Diego, CA 92160
(408) 378-7777
FAX (408) 378-7770

Claims 5, 22 and 35 are patentable for at least the same reasons as Claims 1, 17, and 31, respectively.

Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over Song modified by Waitl further in view of Ishinaga (6,180,962) ("Ishinaga"). Reconsideration is requested.

Claim 6 depends from Claim 1. Ishinaga does not make up for the deficiencies of Song and Waitl. Accordingly, Claim 6 is patentable for at least the same reasons as Claim 1.

Claims 8-12 and 23-27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Song in view of Bogner et al. (7,026,657) ("Bogner"). Reconsideration is requested.

Claims 8-12 depend from Claim 1 and Claims 23-27 depend from Claim 17. Applicant's attorney submits that Bogner does not make up for the deficiencies of Song. Accordingly, Claims 8-12 and 23-27 are patentable for at least the same reasons as Claims 1 and 17.

Claims 13-14, 28, and 30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Song in view of Wu (6,769,773) ("Wu"). Reconsideration is requested.

Claims 13-14 depend from Claim 1 and Claims 28 and 30 depend from Claim 17. Applicant's attorney submits that Wu does not make up for the deficiencies of Song.

Moreover, Applicant points out that Claim 14 recites "the chip includes one of a wavelength converting layer, a diffractive layer, a micro-refractive layer, and a filter layer and a polarizer layer that forms the light emitting surface." Wu discloses a "rotating fluorescent plate 71". Clearly plate 71 is not part of the UV light source 70 in Wu, as plate 71 rotates which "sequentially generates red, green and blue colors". Col. 3, lines 36-48.

Accordingly, Claims 13-14, 28, and 30 are patentable for at least the same reasons as Claims 1 and 17.

New Claim

New claim 43 has been added, which depends from claim 1 and recites "wherein there are no intervening optical elements between the light emitting surface of the chip and the collimating optical element." Support for claim 43 may be found, e.g., Fig. 6 and the accompanying text, including paragraph [0039]. As discussed above, Song discloses that the

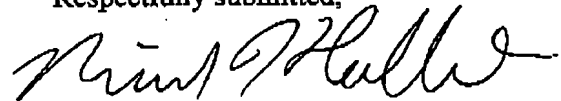
SILICON VALLEY
PATENT GROUP LLP

18801 COW AVE
SUITE 220
SUNNYVALE, CA 95070
(408) 978-7777
FAX (408) 371-7770

light source 110 is "provided as a diode module having a protective window. That is, light diverging from a light emitting diode chip passes through the protective window". Paragraph [0065]. Moreover, Song illustrates a hemispherical lens between the light source 110 and the collimator lens 120. Thus, Song does not teach or suggest that "there are no intervening optical elements between the light emitting surface of the chip and the collimating optical element" as recited in claim 43.

For the above reasons, Applicants respectfully request allowance of Claims 1-35 and 43. Should the Examiner have any questions concerning this response, the Examiner is invited to call the undersigned at (408) 378-7777.

Respectfully submitted,



Michael J. Halbert
Attorney for Applicant(s)
Reg. No. 40,633

SILICON VALLEY
PATENT GROUP LLP

18803 Coss Avenue
Suite 220
San Jose, CA 95070
(408) 378-7777
FAX (408) 378-7770